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Cochrane Corner: are there benefits to using web-based interventions in the secondary prevention of coronary heart disease?

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Cardiovascular diseases cause more deaths annually than any other disease¹. It is possible to successfully reduce cardiac risk factors in people with coronary heart disease (CHD) with secondary prevention interventions. However many people with CHD do not take part in these programmes. Recent data shows that 47% of people discharged following myocardial infarction, percutaneous coronary intervention and coronary artery bypass surgery in England, Wales, and Northern Ireland between 2013 and 2014 took part in a cardiac rehabilitation programme².

One way to improve access to these programmes is to provide programmes at home. A previous Cochrane review reported the effectiveness of home-based programmes compared with centre-based cardiac rehabilitation³. No differences between these programmes in the number of clinical events, exercise capacity, blood pressure, total cholesterol, proportion of smokers or health-related quality of life (HRQOL) were reported.

Secondary prevention programmes can also be delivered through the Internet. Such interventions offer low-resource and scalable solutions at a time when the rising prevalence of heart disease and economic pressures on health services are demanding low cost innovations. Delivery of interventions via the Internet is also expected by an ever more connected population, including those in older age groups likely to be more affected by CHD, who are increasingly familiar with using online services, unrestricted by time or geographic location, in many areas of their lives.

In this Cochrane Corner, we highlight a Cochrane review that assessed the effect of secondary prevention interventions delivered via the Internet⁴. We examined effects on clinical outcomes, cardiovascular risk factors, lifestyle factors, compliance with medication, and healthcare utilisation and cost.

A comprehensive search conducted in December 2015 identified all relevant randomised controlled trials (RCTs) evaluating web-based interventions for the secondary prevention of coronary heart disease. We included 11 completed studies, involving 1392 participants. Seven ongoing trials also met our inclusion criteria, these trials do not yet have data available but findings will be incorporated in updates of this review. In the 11 completed trials the comparison group was usual care in 6 trials, a minimal intervention in 3 trials, and traditional cardiac rehabilitation in 2 trials. The intervention was delivered using the Internet only in 7 trials, and both the Internet and mobile telephone technology in 4 trials. Seven interventions were multidisciplinary, and targeted the general management of CHD, and 4 interventions focused on physical activity promotion only.

Overall we found no significant effects on clinical outcomes but the numbers of clinical events contributing to these analyses were very small. There was no effect on all-cause mortality (odds ratio (OR) 0.27, 95% confidence interval (CI) 0.04 to 1.63; participants = 895; studies = 6; low-quality evidence), or revascularisation (OR 0.69, 95% CI 0.37 to 1.27; participants = 895; studies = 6; low-quality evidence), there was only one case of cardiovascular mortality which occurred in a control group (participants = 895; studies = 6), and no cases of non-fatal re-infarction reported. Given that Internet interventions are in their infancy, observing a mortality effect may have been premature.

For cardiovascular risk factors there were no significant effects found for total cholesterol (mean difference (MD) 0.00, 95% CI -0.27 to 0.28; participants = 439; studies = 4; low-quality evidence), high-density lipoprotein (HDL) cholesterol (MD 0.01, 95% CI -0.06 to 0.07; participants = 437; studies = 4; low-quality evidence), or triglycerides (MD 0.01, 95% CI -0.17 to 0.19; participants = 439; studies = 4; low-quality evidence). Data for low-density lipoprotein (LDL) cholesterol or systolic or diastolic blood pressure could not be pooled due to considerable heterogeneity and there were inconsistent findings from individual trials. HRQOL was measured in five trials. No conclusions could be drawn from one study due to incomplete reporting; no effect was reported from one trial; a short- and medium term effect was reported in two studies respectively; and both short- and medium-term effects were reported in one study reported.

Lifestyle factors were also examined. Effects on dietary outcomes were reported in five trials; of which positive effects were reported in two trials, and no effects reported in three trials. Physical activity was assessed in eight studies; there were no effects in five of these trials, and favourable effects in three trials.

Two studies measured healthcare utilisation: no effects were found in one trial, and the other reported increased usage of healthcare services at a nine months follow up in the intervention compared to a control group. Cost data were

collected by two trials, of which both reported that interventions delivered through the Internet are likely to be cost-effective. No trials have yet measured the affect of Internet interventions on medication compliance.

Limitations

There was appropriate randomisation and appropriate concealment of randomisation processes across the majority of trials. There was however a risk of performance bias associated with a lack of blinding in seven studies, and in five trials a risk of detection bias. Risk of attrition bias, and reporting bias were found in two and five trials respectively. A summary of the review authors' judgements about each risk of bias item across all included studies is presented in figure 1.

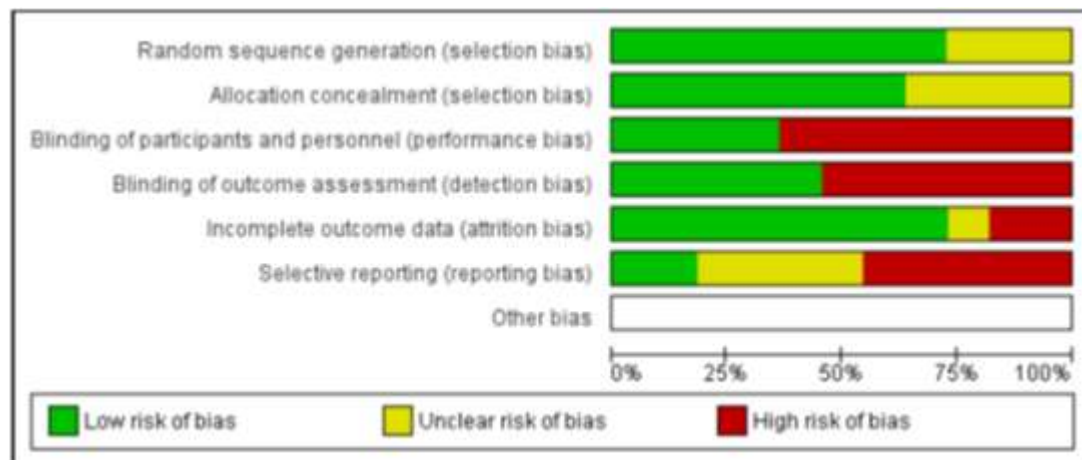
Conclusions are limited by the small number of included studies. There was also heterogeneity between studies in terms of the intervention, the comparison groups, participant characteristics and length of follow-up.

This review was planned at a time when smartphone technology was not yet widely used. We found that recently published studies delivered interventions that combined smartphone and Internet site technology. These interventions are therefore evolving rapidly as mobile health apps become commonplace, and in future updates of this review we plan to distinguish between the level of smartphone and Internet site contributions in the design of interventions.

Conclusions

Our review highlights the lack of trial evidence in this area on important patient related outcomes and the need for further research in this area. More trials with longer follow-up are required to determine effects on clinical events and to assess whether other potential effects on quality of life and behaviour change are sustained following the end of the intervention period. There is also a need to examine the intensity and duration of the intervention required to achieve effective secondary prevention of CHD. Future studies should recruit diverse samples, including participants with a wide range of socio-demographic characteristics. This will enable findings to have greater generalizability. In addition, researchers should also measure outcomes using objective instruments where possible.

Figure 1: Risk of bias graph: review authors judgements about risk of bias presented as percentages across all included studies



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